

RIGHT AZYGOS LOBE OCCURRING WITH FISSURAL AND LOBATION ANOMALIES

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Summary

Background: The azygos lobe is a rare anomaly of the lung that is separated from the rest of the upper lobe by an azygos fissure. The lobe is encountered mostly in the right lung but a few cases have also been described in the left lung. It occurs at a frequency of 0.25-1% and has surgical and radiological importance. For example it can give rise to opacity on the X-ray that can mimic lung pathology.

Observations: The azygos lobe was observed in the upper lobe of the right lung from a 45 years old male cadaver during dissection. The apex of the lung contained a vertical fissure that isolated medially the azygos lobe. The lobe appeared columnar in shape and it measured 4.7cm long and 3.7cm wide; its posterior border contained a notch. In addition to the azygos lobe the right lung also contained an incomplete horizontal fissure and therefore was divided by an oblique fissure into two lobes.

Conclusion: The current observation has documented the co-existence of an azygos lobe with incomplete horizontal fissure and two lobes on the right lung. The findings have added knowledge on the morphology of the azygos lobe and have also raised awareness that it can occur with other fissural anomalies.

Key words: Lung, Azygos lobe, Azygos fissure, Horizontal fissure Lobes, Anomalies

Introduction

In the normal anatomy the right lung contains the three upper, middle and lower lobes that are defined by the horizontal and oblique fissures.⁽¹⁾ In the unusual situation congenital anomalies can occur in the lungs and some of the conditions that have been described include the azygos lobe, diaphragmatic fissure, incomplete major fissures, minor fissures and absence or presence of extra lobes.^(1, 2, 3)

The azygos lobe is commonly seen on the medial side of the apical part of the right lung, but a few cases have also been described in the left lung.^(4,5) It is a rare but interesting congenital anomaly that may be confused with pulmonary pathology on radiological investigations.^(1,6) Recent observations have described the occurrence of spontaneous pneumothorax in patients with an azygos lobe.⁽⁷⁾ Continued documentation of the gross morphological features remains to be important and it raises awareness on the presence of this anomaly. The current observation describes the azygos lobe that occurred with fissural and lobation anomalies in the right lung of a 45 years old male cadaver.

Observations

The right lung presented with the azygos lobe, incomplete horizontal fissure and the upper and lower lobes that were defined by the normal looking oblique fissure (Figs. 1, 2). Observations on the costo-vertebral surface revealed a fully developed oblique fissure that measured 25cm long and 5.5cm deep and it appeared to divide the right lung clearly into two lobes; the upper and lower lobes. The costo-vertebral surface also had a small horizontal fissure that was located at about 12cm from the diaphragmatic surface. It measured 3cm long and 1.5cm deep and appeared to begin at the junction with the oblique fissure and passing horizontally towards the anterior border into the lung tissue. There was no indication suggesting the presence of adhesions or obliteration. The lung tissue beyond an incomplete fissure appeared normal with no area suggestive of adhesion.

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Figure 1. The photograph of the costo-diaphragmatic surface of the right lung from a 45 years old male cadaver showing the oblique fissure (*small arrowheads*) dividing the lung in the upper (*UL*) and lower (*LL*) lobes. The surface also shows a small incomplete horizontal fissure (*thick arrowheads*)



The morphology of the azygos lobe was best visualized on the visceral surface and at the anterior and posterior borders of the right lung. The upper lobe contained a well-developed azygos fissure that measured 3.5cm deep and it divided the apical part of the lung into two portions; a small medial part that constituted the azygos lobe and a large lateral part of the lung (Fig 2). The fissure terminated above but close to the hilum of the lung and its base appeared smooth and molded by the arch of the azygos vein. The anomalous azygos lobe appeared medial to the azygos fissure and it measured 4.5cm tall and 3.7cm wide. The lobe appeared columnar in shape and resting on the upper part of the hilum. The posterior border of the azygos lobe appeared to contain a notch that was created by the azygos vein as it turned forward from the posterior mediastinum to enter the azygos fissure (Fig. 2b). The posterior border also showed the lung tissue that extended from the base of the azygos lobe to reach the oblique fissure. The anterior border was smooth and continued from the hilum to the apex of the azygos lobe where it became continuous with the posterior

border (Fig.2c). The left lung appeared normal; the costo-vertebral surface contained the oblique fissure that divided it into two upper and lower lobes. There was no additional fissure or lobes. The medial surface of the left lung also did not have abnormalities

Figure 2a-c. The photographs of the anomalous right lung from a 45 years old male cadaver taken at different views. a) The visceral surface contains the azygos lobe (*AZ*) above the hilum and the oblique fissure (*small arrowheads*) that divides that lung into the upper (*UL*) and lower (*LL*) lobes.

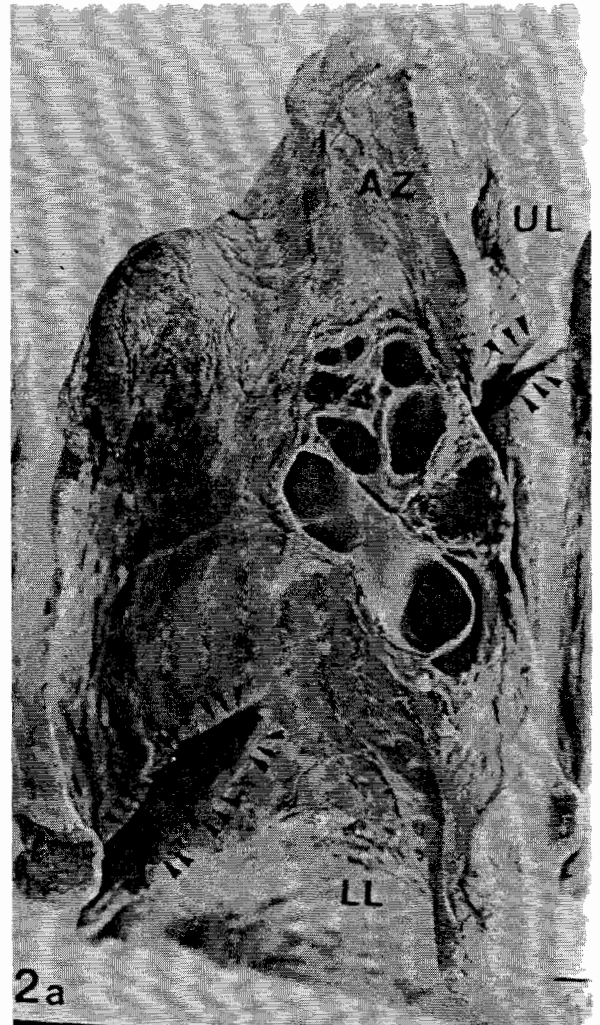


Figure 2b) The posterior border of the azygos lobe (AZ) contains the notch (arrows). Note the position of the oblique fissure (small arrowheads) and the upper (UL) and lower (LL) lobes.

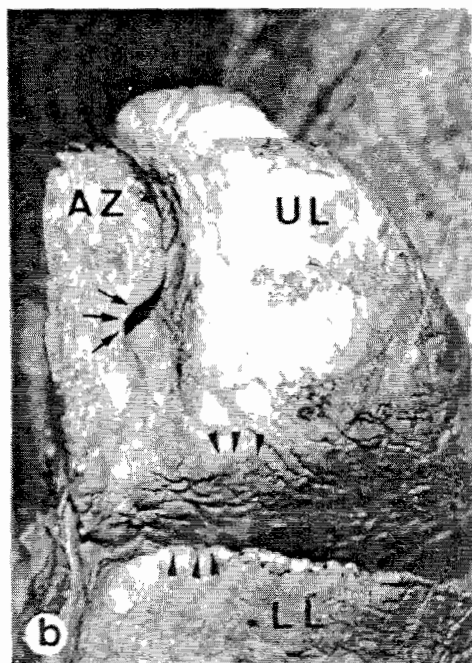
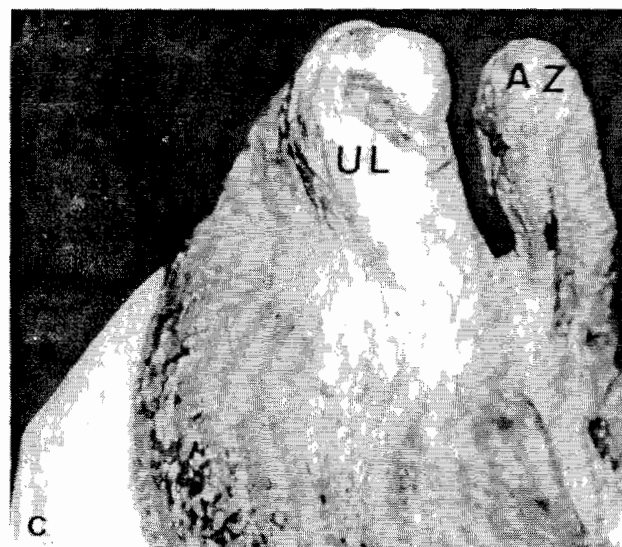


Figure 2c) The anterior border of the azygos lobe (AZ) appears smooth. Note the azygos fissure between the apical portion of the upper lobe (UL) and the azygos lobe (AZ)



Discussion

The azygos lobe is a rare anomaly and has been shown to occur at the frequency of 0.25-0.9% and other reports have showed the range of 1-1.2% (1, 2). This is a second observation after studying 175 lung specimens during dissection.⁽⁸⁾ In the current report the azygos lobe was observed in the right lung, which also showed incomplete

horizontal fissure and two lobes instead of three. This is the first report in which the azygos lobe existed with lobation and major fissural anomalies and it indicates that azygos lobe can co-exists with other lung anomalies. In the past studies azygos lobe has been reported to co-exist with esophageal atresia and extra-pulmonary course of the bronchial vein.⁽⁹⁾ The occurrence of the azygos lobe and fissural anomalies observed in this report are considered to be incidental findings and may not share a common embryonic pathway. Development of major fissures of the lung depends on the branching pattern of the bronchial tree, while the formation of the azygos lobe depends on the interaction between the developing azygos venous system and the lung.⁽¹⁾ Molecular pathways that regulate the formation of azygos lobe are not well understood, but morphologically it is believed that the apical expansion of the lung during development results into incorporation of the azygos vein between the portions of the lung tissue. This process results into the formation of the azygos fissure and prevent migration and decent of the azygos vein into the adult position, consequently the vein is accommodated in a fissure that isolate medially a small lung tissue that constitute the azygos lobe.⁽¹⁾

The current observations indicated that the horizontal fissure was absent and was represented by a small and shallow fissure and consequently the right lung presented with two lobes instead of three. Major fissural anomalies have been described in the past and include absence or incomplete formation of the horizontal or oblique fissures.⁽³⁾ Past observations on lung specimens have showed that incomplete horizontal fissure occurs at the frequency of 45-65%^(2,3,10); recent observations in our laboratory indicated a frequency of 7.9%⁽⁸⁾. Fissural anomalies are not associated with ill health, but may produce abnormal radiological findings. Familiarization with the morphological features of lung anomalies remains to be important for the management of patients. The current observation has raised the awareness that the azygos lobe can occur with fissural and lobation anomalies.

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